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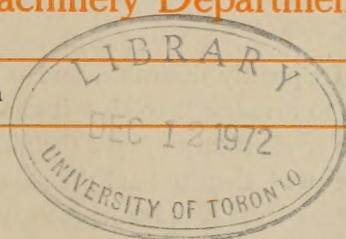
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Crushing and Cement Machinery Department

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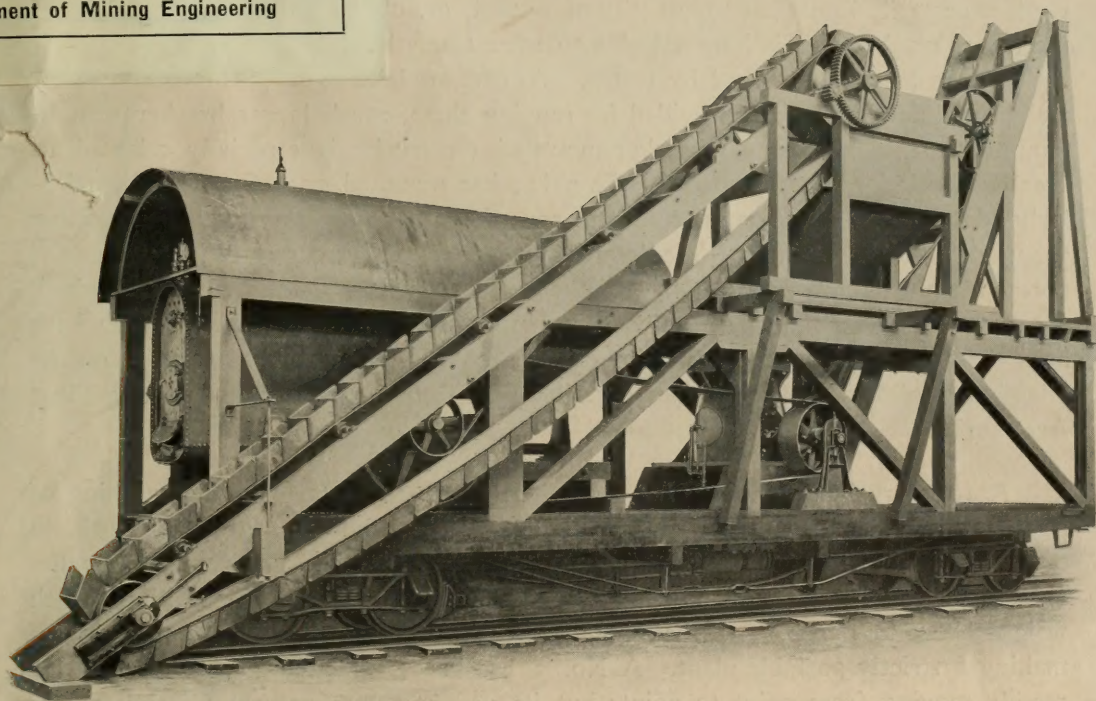
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ROCK CRUSHING PLANTS



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MILWAUKEE, WISCONSIN, U. S. A.

By Allis-Chalmers Company

PORTABLE ROCK CRUSHING PLANTS

It is frequently desirable, and often absolutely necessary, in installing a Crushing Plant, to arrange it so that it can be readily moved from place to place, it being often more economical to move the plant nearer to the point where the crushed product is to be used, than to haul the stone any considerable distance. A portable plant, therefore, can be used advantageously when suitable quarries are to be found along the line of work.

Portable plants are made in two styles; one with the breaker mounted on trucks, and the other with the outfit mounted on a railroad car. Breakers of the smaller sizes can be mounted on heavy trucks and hauled by team. This style of portable rig is necessarily limited as to quantity of output, as, owing to the great weight of the larger machines, it is impracticable to mount anything but small machines on such trucks as can be moved by teams. As cars are built to support a much greater weight and ample power is provided for moving them, much larger breakers can be mounted in this manner. A breaker mounted on trucks is especially adapted to breaking rock for country roads, while a breaker mounted on a flat car is particularly adapted for ballast work; although sometimes plants transported in this manner are used for other purposes. We describe, in the following pages, different types of portable plants, representing a few of the many we have built. Breakers which we mount in this manner are the well-known Gates Gyratory Breakers, which have been the standard for a quarter of a century. We shall be pleased to mail, on application, copies of our catalogues describing the Gates Breakers and Crushing Plant Accessories.

A rock crushing machine has very hard work to perform in the crushing of rock, and must of necessity be of considerable weight and have great strength, in order to withstand the severe duty imposed upon it. Its weight renders it impracticable to make it portable in any but the smaller sizes. A No. 2 machine, which weighs about four tons, is all that should be mounted on wheels with the idea of making a strictly portable plant. A No. 3 breaker is frequently so mounted for readily moving from point to point; but its weight offers natural difficulties, impossible in many cases to overcome, and it cannot be used or moved as conveniently as the lighter outfit.

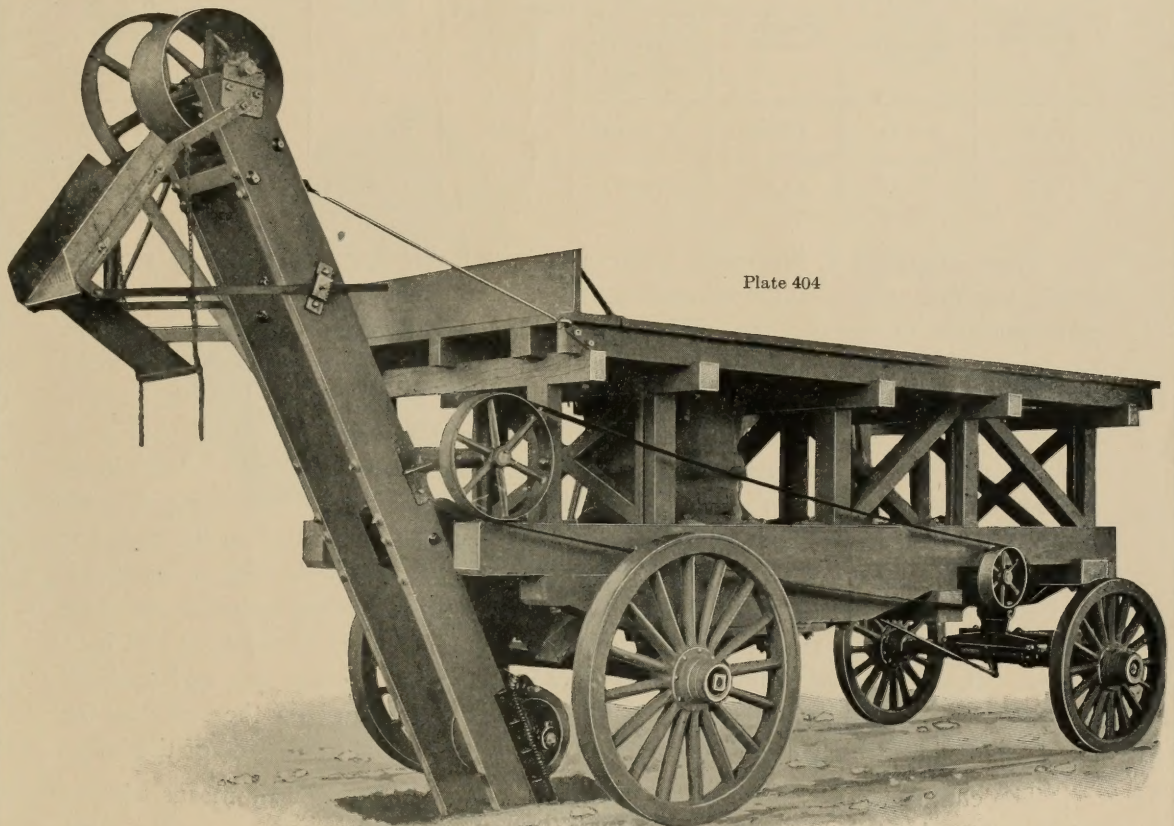


Plate 404

PORTABLE BREAKER MOUNTED ON WOOD TRUCK.

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Table 1. Dimensions, Weights, Capacities and Required Power of Style "D" Breakers, Mounted on Wood Trucks.

Size of Breaker	Dimensions of each Receiving opening in Breaker	Approx. wt. of outfit in pounds	Cap. per hour according to character of rock in tons of 2,000 lbs. to 2½" to 5" ring size.	Smallest size product can be made in one break	Driving Pulley Inches Dia. Face	Revolutions per minute of Driving Pulley	H. P. required to drive outfit
2-D	6 x 21	17,950	6 to 12	1½"	24 x 8	450	12 to 15
3-D	7 x 22	24,314	10 to 20	1¾"	28 x 10	425	20 to 25

Plate 404, page 3, illustrates a No. 3 style "D" breaker mounted on a wooden truck, together with a short elevator and a dust screen. This makes a very complete portable crushing plant. The manner in which the breaker is mounted on the truck permits the lowering of the bottom plate and offers every facility for making repairs and for inspection. The construction of the frame and truck is very heavy and amply strong for the purpose. The top of the frame is boarded over level with the top of the hopper and forms a very convenient feeding floor. The wheels are heavy in construction and are of the well-known Sarven type rimmed with heavy wide steel tires. The axles are forged from steel and turned on the ends for the wheels. A heavy tongue with the usual whiffletree and neck yoke is furnished. The elevator is removed from the truck when the outfit is being moved from place to place; it is made from 10 to 12 feet long between the centers of the head and boot pulleys. It is furnished complete with heavy wood frame, bucket belt and buckets, the boot shaft being fitted with a suitable tightener for taking up the slack in the bucket belt. All iron carrying rollers are furnished for the loaded side of the belt.

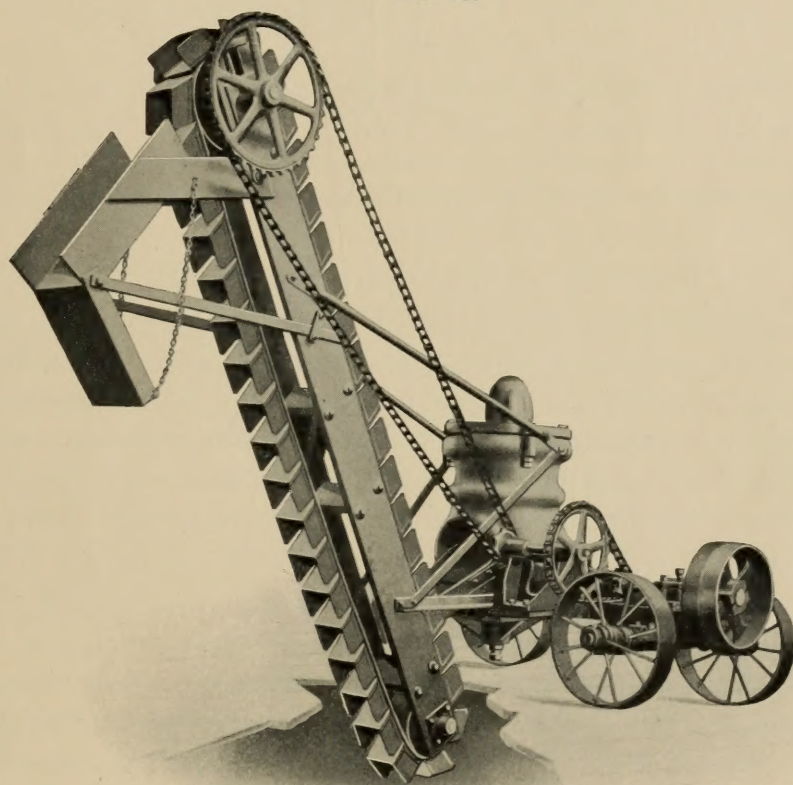
The chute screen is attached to the head end of the elevator by means of iron brace rods and consists of perforated plate with sides turned up so as to form a chute on which the stone is discharged from the elevator. The larger stone slides from the screen into the wagon or car, while the dust and stone small enough to go through the holes in the screen drop down on the deflecting plate, which discharges it away from the wagon or car to form a pile on the ground. The cut here shows the elevator without bucket belt or buckets. These were omitted to better illustrate the construction of the outfit. A suitable back gear driving connection consisting of bevel gears and shafting, bearings, pulley and belts is furnished for transmitting power from the outer end of the breaker countershaft to the intermediate countershaft which drives up to the elevator head shaft.

The outfit described above is the most satisfactory in service that has been used.

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To fill the demand, however, for a portable plant less expensive than this, we have designed a steel truck machine, which, while costing less to build and not as complete in its appointments, makes a very satisfactory plant. We illustrate one below.

Plate 1469



PORTABLE BREAKER MOUNTED ON STEEL TRUCK.

The above cut illustrates our new portable outfit, showing Breaker, Elevator and Chute Screen mounted on steel truck.

We mount the Nos. 1, 2 and 3 Breakers in this manner.

ALLIS-CHALMERS COMPANY

Table II. Dimensions, Weights, Capacities and Required Power of style "D" Breakers, mounted on steel trucks.

Size of Breaker	Dimensions of each Receiving Opening in Breaker	Approximate weight of Outfit, Lbs.	Capacity per hour according to character of Rock in tons of 2000 lbs. to 2½" to 5" ring size	Smallest size product can be made in one break	Driving Pulley Inches Dia. Face	Rev. per min. of Driving Pulley	H. P. Required to drive outfit
1-D	5" x 18"	7800	4 to 8	1"	2 7	475	8 to 10
2-D	6" x 21"	10954	6 to 12	1½"	24 8	450	12 to 15
3-D	7" x 22"	16930	10 to 20	1¾"	28 10	425	20 to 25

For detailed description of style "D" Breaker see Bulletin 1415.

Like the wood frame outfit, this consists in mounting a style "D" Gates Breaker with elevator and chute screen, but the truck is made of steel with iron and steel wheels. The great advantage in having a feeding floor is not obtained in this outfit, and drives for the latter are not as long or good as in the wood truck machine. It is entirely practicable to operate, however, and after the stone is put into the breaker it will be crushed and handled in a manner quite as satisfactory. It is found more convenient in this type to make the breaker with right angle drive; that is, have the stone discharge at right angles to the breaker countershaft. The rear axle of the truck is fastened under the flange of the main shell of the breaker and the front axle is carried in an iron bolster casting extending in front of the breaker, allowing the front wheels to turn. The tongue, whiffletrees and neck yoke are furnished. The elevator and chute screen are identical with that described for the wood truck machine and are driven by sprocket chain by means of an intermediate countershaft from the main countershaft of the crusher. These machines should be jacked up and blocked when running. The elevator and chute screen are removed when the plant is being moved. The same care is exercised in making these outfits that has been employed in the manufacture of the Gates Breaker since its inception, and which has contributed so largely to keeping it at the head of this line of work, and, out of long experiences along these lines, absolute satisfaction can be assured.

All efforts to make the CHEAP mounted breaker result in partial failure. It takes good material and plenty of it to support a breaker, either when moving it along a

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highway or when in operation. Breakers larger than No. 3 size have never been satisfactorily made portable. This has been attempted, but with a No. 4 breaker, which alone weighs nearly eleven tons, it is obvious that such a rig could not be safely hauled or moved over country roads. We therefore limit ourselves to the No. 3 machine and under for this class of work.

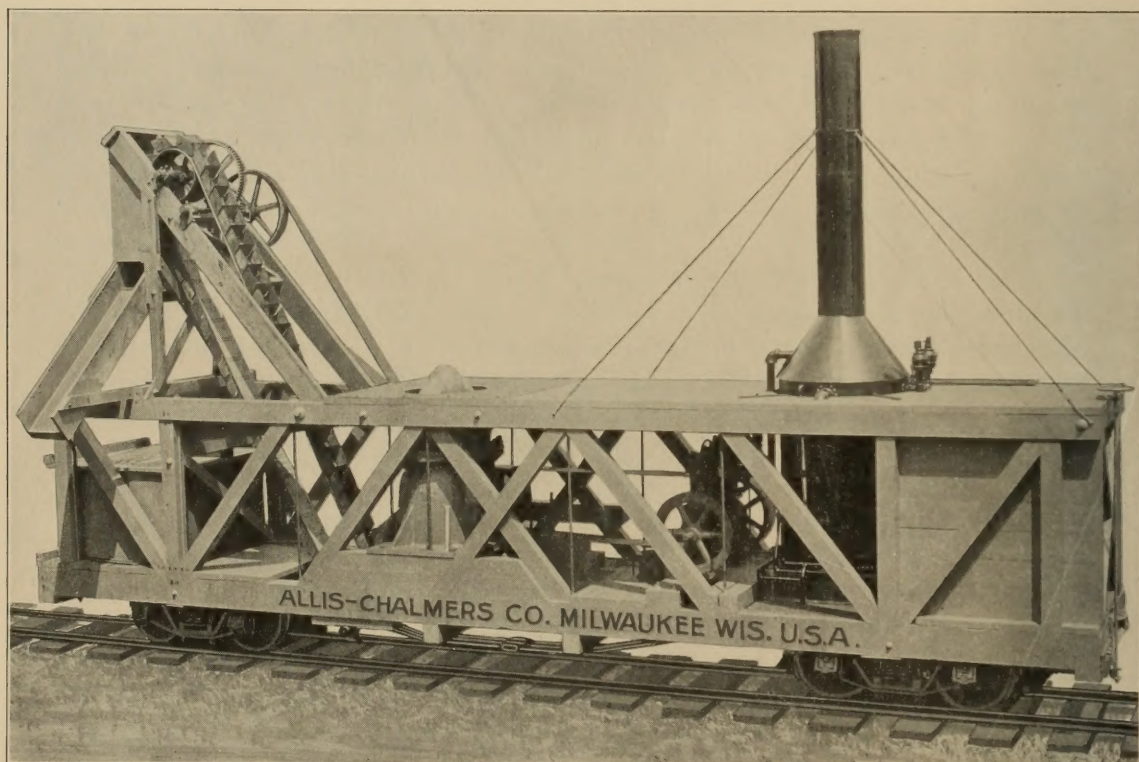
PORTABLE ROCK CRUSHING PLANTS MOUNTED ON RAILROAD CARS.

We have made a large number of Crushing Plants mounted on railroad cars, these having been designed for many purposes, among which we may mention producing stone for concrete work and sand making plants. The most common use to which these plants are put, and the purpose to which they are particularly suited, is the making of ballast for railroad work. It is easily to be seen that there are many cases where a plant of this nature can be used to advantage when there is plenty of rock along the line of way, thus saving the long haul of the crushed stone, which is necessary when a stationary plant is used. Naturally there are many limitations to a plant of this character, as the space available is restricted by the size of the car, and the height of the outfit above the rail is frequently regulated by tunnels or bridges along the way. Ballast from a plant of this kind cannot be produced as cheaply as with a stationary plant, as it is impracticable to move breakers of the larger sizes, even on a railroad car, and it is only in the largest plants where the cost of crushing stone is reduced to a minimum. Complete plants are made, however, including crusher, short elevator, either chute screen or revolving screen, with the power plant mounted on same car. In such plants it is usually necessary to do a certain amount of dismantling before the plant can be moved through tunnels or over bridges. As a rule only No. 4 and No. 5 breakers are mounted in this manner. Larger and smaller breakers can be so mounted, but No. 4 and No. 5 sizes are best adapted for this work. We illustrate on the title page a plant built for use in South Africa, which is one of the largest and most improved outfits of this character that has yet been constructed.

This plant was equipped with a feeding elevator carrying the material to be crushed up from the ground to the hopper at the side of the crusher. The material, after passing through the breaker, is spouted to the elevator and so in turn elevated and spouted into a car on an adjoining track. The crusher is driven from a side crank throttling engine mounted under a locomotive type fire box portable boiler, the first elevator being driven direct from the crank shaft of engine, the second elevator being driven from the crusher countershaft. The car is of very substantial construc-

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tion, having heavy truss rods underneath and the frame work built to suit the machinery in the plant, a heavy crusher floor being arranged around the crusher hopper so that the crusher can be properly and easily fed. The feeding elevator shown in the foregoing cut is not usually employed and other arrangements are made for the feeding of the machine.



This illustration shows the crusher driven from a vertical engine, which is connected to a vertical boiler, and the cut shows clearly the arrangement of the crusher, the feeding floor, elevator and chute screen. We advise, however, that the locomotive type with under-mounted horizontal engine be used rather than the vertical boiler and engine shown in this cut.

CRUSHING AND CEMENT MACHINERY DEPARTMENT

Table III. Dimensions, Weights Capacities and Required Power of style "K"
Breakers, mounted on Railroad Flat Cars.

Size of Breaker	Dimensions of each Receiving Opening	Approx. Wt. of Outfit in Lbs.	Capacity per hour according to character of Rock in tons of 2000 lbs. to 2½" to 5" Ring size	Smallest size Product can be made in One Break	Driving Pulley Inches Dia. Face	Rev. per minute of Driv. Pulley	H. P. Required to Drive Outfit
4-K	8 x 30	87,680	15 to 40	1½"	32 12	400	25 to 30
5-K	10 x 38	103,710	30 to 70	1¾"	36 14	375	40

For detailed description of style "K" Breaker see Bulletin 1416.

SPECIAL PORTABLE PLANTS.

We are prepared to design portable crushing plants for any specific purpose, including all necessary machinery. It may be essential in the case of an extensive plant to use two or more cars and we shall be pleased to give our advice as to the proper arrangement to produce any desired result, but we would ask, in case inquiries are sent in, that all possible information as to the requirements be given, such as the amount of material to be handled per hour, character of the rock and size to which it is to be reduced.

STATIONARY CRUSHING PLANTS.

We shall be pleased to send, upon request, our catalogue of machinery for Stationary Crushing Plants. As the largest and oldest builders of machinery for this purpose, we are in position to design plants and furnish machinery which will be up-to-date and satisfactory in all respects. We furnish everything in the way of machinery and equipment for a plant for reducing rock.

ELECTRIC DRIVE FOR CRUSHING PLANTS.

We are prepared to furnish, when desired, generators, motors and electrical equipment especially designed for driving heavy machinery, such as has been very successfully used for Crushing Plants. It is frequently expedient to employ such apparatus, and there seems to be, in some cases, a prejudice entirely without foundation against the use of electricity as power for plants of this character. We shall be glad at any time to give intending purchasers plans and estimates for electric power equipment based upon the best engineering practice, as developed by experience.

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